

# Assignment 2

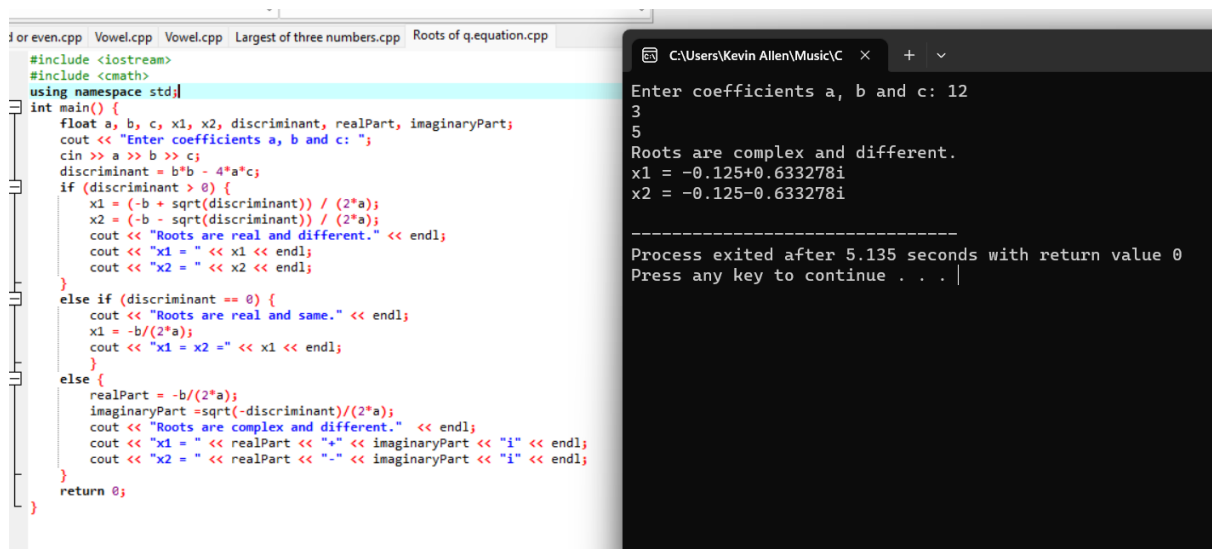
## DSA0156-Object oriented programming

### C++ Gaming

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#### 1. C++ Program to Find All Roots of a Quadratic Equation

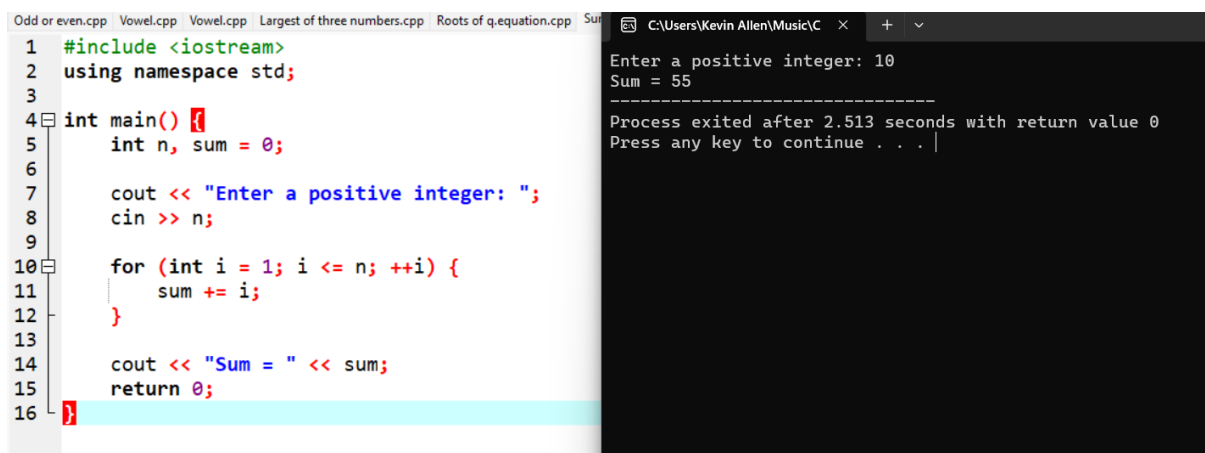


```
#include <iostream>
#include <cmath>
using namespace std;

int main() {
    float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;
    if (discriminant > 0) {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }
    else if (discriminant == 0) {
        cout << "Roots are real and same." << endl;
        x1 = -b/(2*a);
        cout << "x1 = x2 = " << x1 << endl;
    }
    else {
        realPart = -b/(2*a);
        imaginaryPart = sqrt(-discriminant)/(2*a);
        cout << "Roots are complex and different." << endl;
        cout << "x1 = " << realPart << "+" << imaginaryPart << "i" << endl;
        cout << "x2 = " << realPart << "-" << imaginaryPart << "i" << endl;
    }
    return 0;
}
```

Enter coefficients a, b and c: 12  
3  
5  
Roots are complex and different.  
x1 = -0.125+0.633278i  
x2 = -0.125-0.633278i  
-----  
Process exited after 5.135 seconds with return value 0  
Press any key to continue . . . |

#### 2. C++ Program to Calculate Sum of Natural Numbers



```
#include <iostream>
using namespace std;

int main() {
    int n, sum = 0;

    cout << "Enter a positive integer: ";
    cin >> n;

    for (int i = 1; i <= n; ++i) {
        sum += i;
    }

    cout << "Sum = " << sum;
    return 0;
}
```

Enter a positive integer: 10  
Sum = 55  
-----  
Process exited after 2.513 seconds with return value 0  
Press any key to continue . . . |

### 3.C++ Program to Check Leap Year

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int year;
6     cout << "Enter a year: ";
7     cin >> year;
8     if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0) {
9         cout << year << " is a leap year.";
10    }
11    else {
12        cout << year << " is not a leap year.";
13    }
14    return 0;
15 }
```

```
C:\Users\Kevin Allen\Music\C x + v
Enter a year: 2004
2004 is a leap year.
-----
Process exited after 3.224 seconds with return code 0
Press any key to continue . . .
```